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**COSMIC**

NASW-3247

(DRA)



# **JULY MONTHLY REPORT**

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MANAGEMENT AND INFORMATION CENTER Monthly  
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Computer Software Management and Information Center  
112 Barrow Hall — University of Georgia — Athens, Georgia 30602

UNIVERSITY OF GEORGIA  
COMPUTER SOFTWARE MANAGEMENT  
AND  
INFORMATION CENTER

MONTHLY PROGRESS REPORT

July, 1983

UNDER CONTRACT

NASW-3247

August 15, 1983

PREPARED FOR  
TECHNOLOGY UTILIZATION OFFICE  
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
WASHINGTON, D. C.

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## 1. GENERAL INFORMATION

The Twelfth NASTRAN® Users' Colloquium meeting and paper preparation dates have been set. The Colloquium will be held in Orlando on May 7-11, 1984.

The Director and the NASTRAN Project Coordinator travelled to Huntsville, Alabama on July 6th and 7th to discuss the new NASTRAN maintenance contract with Sperry Systems. The Director and the COSMIC Benefits Analyst also travelled to the Goddard Space Flight Center and to NASA Headquarters on July 12-14 for a demonstration of the TAE and NEXUS systems and to talk with NASA officials.

The Director was invited to speak at the Engineering Exhibit Southeast in Orlando, Florida on July 20-22. As a result, an article about COSMIC appeared in the Orlando Sentinel Star.

## 2. INVENTORY

The current inventory of programs available from COSMIC is the sum of the Class 1 and Class 2 programs in TABLE 1. "Issuability Status Summary." The total number of items submitted from each source since COSMIC began is given in the right hand column of TABLE 1. Numbers listed under the "Withdrawn" column reflect those packages for which return or discard authorization has been provided by the appropriate Technology Utilization Office.

TABLE 1. ISSUABILITY STATUS SUMMARY

July 1966 to Date

<u>Center Mnemonic</u>	<u>Class 1</u>	<u>Class 2</u>	<u>Class 3</u>	<u>Class 4</u>	<u>In Process</u>	<u>With- drawn</u>	<u>Total</u>
ARC	33	10	4	1	1	34	83
COS	0	17	0	1	0	65	83
DOD	0	50	0	0	1	34	85
ERC	0	0	0	0	0	13	13
ERL	9	7	0	0	0	1	17
FRC	5	6	0	0	0	4	15
GSC	84	40	2	2	1	225	354
HQN	15	7	0	3	0	72	97
KSC	5	22	0	1	1	81	110
LAR	169	60	3	5	0	81	319
LEW	140	77	0	3	2	87	309
MFS	96	108	2	5	4	1125	1340
MSC	91	142	2	1	7	795	1038
NPO	84	50	0	1	4	254	393
NUC	9	6	0	0	0	60	75
WLP	0	0	0	0	0	11	11
WSO	0	0	0	0	0	3	3
Totals	740	602	13	23	21	2945	4345

The number of submittals for the current month is average. COSMIC received fourteen initial packages (program and documentation). Also, COSMIC received two additional packages, two additional programs, and one update program. The total number of receipts for this month is nineteen. A summary of the total number of receipts by submittal site is shown in TABLE 2.

TABLE 2. SUMMARY OF TOTAL RECEIPTS 1983

<u>Submittal Site</u>	<u>This Month</u>	<u>Year to Date</u>
ARC	1	2
COS	0	0
DOD	1	5
ERL	3	4
GSC	2	13
HQN	0	9
KSC	1	2
LAR	1	13
LEW	2	17
MFS	2	6
MSC	5	19
NPO	<u>1</u>	<u>8</u>
Total	19	98

### 3. EVALUATION AND PUBLICATION

The program processing activities can be viewed as a three step process, although the steps are not necessarily done in sequence. These steps are program verification, program evaluation, and abstract preparation and publication.

Program verification represents the machine processing phase of evaluation and typically includes the compilation or assembly of supplied code using standard programming language translators followed by loading or linkage editing of the generated object code to insure completeness of the submitted code. This month COSMIC processed eighteen programs through verification.

Program Evaluation involves the review of programs and supporting documentation following the machine processing phase to determine their suitability for public release relative to the standards of completeness and content specified in the COSMIC Submittal Guidelines. Prices for distributed materials are also established during package evaluation. Factors considered in establishing the price charged for program code include the program source instruction counts as a gross measure of development effort, the machine independence or vintage, the quality of the supporting documentation, the known or assumed sales potential for the package, the functionality of the program relative to comparably classified packages, and the demonstrated level of developer programming support.

The program evaluation activity for the current month totaled 23 packages; twelve Class 1, three Class 2, seven Class 3, and one Class 4.



A cumulative tabulation of COSMIC evaluations since January 1, 1983, is given in TABLE 3.

TABLE 3. SUMMARY EVALUATION TOTALS  
January 1983 to Date

<u>Submittal Site</u>	<u>Class 1</u>	<u>Class 2</u>	<u>Class 3</u>	<u>Class 4</u>
ARC	1	0	4	0
COS	0	0	0	0
DOD	0	3	3	1
ERC	0	0	0	0
ERL	4	0	0	0
GSC	10	1	5	2
HQN	9	0	0	3
KSC	0	1	0	1
LAR	11	0	4	1
LEW	10	0	0	6
MFS	2	0	5	2
MSC	8	3	4	1
NPO	6	0	4	0
NUC	0	0	0	0
WLP	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Totals	61	8	29	17

Publication activities carried out by COSMIC include the preparation of descriptive abstracts for all new submittal and updated Class 1 and 2 items evaluated each month as well as the preparation of Tech Briefs for the Class 1 packages for publication in the NASA Tech Brief Journal.

Publication category codes and index terms are assigned to abstracts prepared by the activity. This month COSMIC prepared twelve abstracts and ten Tech Briefs. A list of the titles for which Tech Briefs were prepared is given below:

#### TECH BRIEF ITEMS

ERL-10015 - ELAS - Earth Resources Laboratory Applications Software  
(PRIME Version)

ERL-10016 - ELAS - Earth Resources Laboratory Applications Software  
(SEL Version)

ERL-10017 - ELAS - Earth Resources Laboratory Applications Software  
(VAX Version)

GSC-12852 - The Nimbus-7 Coastal Zone Color Scanner Derived Products Software

GSC-12881 - TAE - Transportable Applications Executive

LAR-13183 - PAFAC - Plastic and Failure Analysis of Composites

LEW-14000 - ANDUCT - Velocity Gradient Method for Calculating Velocities in  
an Axisymmetric Annular Duct

MSC-20278 - IPMS II - Integrated Procurement Management System, Version II

MSC-20641 - Data I/O PROM Programmer Software for Motorola Exorcisor

MSC-20644 - PLATE.FORT - A Data Generating Program for ASKA Modeling

MSC-20645 - Standard Fastener Hardware Library for Graphics Computer

NPO-16274 - ARCH - A File Archival System for the DEC VAX

# COSMIC PROGRAM ABSTRACT

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DOD-00086

## PASSIVE ANTI-ROLL TANK PROGRAM (Naval Sea System Command)

Each ship has a natural roll frequency that determines when and how severe the ship will experience roll conditions. By designing a liquid filled tank with a slightly different natural roll frequency and placing it at the center of gravity of the ship, a "passive anti-roll" system is obtained. This computer program was developed to calculate the natural roll frequency of a ship and to design a passive anti-roll tank. The tank design generated meets design criteria, except that no corrections are made for the tank vertical location and no detailed nozzle computations are performed.

An initial tank design is generated based on the ship's beam size and the ship's static moment per degree. The tank may be of rectangular or H-shaped design depending on the ship. The tank depth, duct ratio, location of damping, and transverse length are systematically adjusted so that the tank frequency is about 1.06 to 1.10 times the ship's natural roll frequency. The tank "active weight" is adjusted upward to be at least one-half of one percent of the ship's displacement. The final tank design and its affect on ship parameters are output.

This program is written in FORTRAN IV for batch execution and has been implemented on an IBM 360 series computer with a central memory requirement of approximately 33K of 8 bit bytes. This program was developed in 1975.

LANGUAGE: FORTRAN IV

MACHINE REQUIREMENTS: IBM 360 Series

PROGRAM SIZE: Approximately 400 Source Statements

DISTRIBUTION MEDIA: 9 Track 800 BPI EBCDIC Card Image Format  
Magnetic Tape

PROGRAM NUMBER: DOD-00086

DOCUMENTATION PRICE: \$9.50

PROGRAM PRICE: \$225.00

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# COSMIC PROGRAM ABSTRACT

ERL-10013  
ERL-10014  
ERL-10015  
ERL-10016  
ERL-10017

**ELAS - EARTH RESOURCES LABORATORY APPLICATIONS SOFTWARE**  
(NASA Earth Resources Laboratory)

The Earth Resources Laboratory Applications Software (ELAS) is a geobased information system designed for analyzing and processing digital imagery data. ELAS was developed mainly to process remotely sensed scanner data, especially the multispectral data acquired by the various NASA Landsat satellites. In addition to Landsat multispectral data, the ELAS system will support the processing of other data such as aircraft-acquired scanner data, the Return Beam Vidicon (RBV) data from Landsat satellites, digitized topographic data, and numerous other ancillary data, such as soil types and rainfall information, that can be stored in digitized form. As an integrated image processing and data base maintenance system, ELAS offers the user of remotely sensed data a wide range of easy to use capabilities in the areas of land cover analysis.

The ELAS system is structured in terms of an operating subsystem and a collection of application modules. The operating system handles all of the required input/output functions, system control functions, and the swapping in and out of applications modules as they are needed. The versatile operating subsystem and the available application modules allow the user to perform a wide range of land cover analyses, as well as data base construction and manipulation. The available ELAS capabilities include: derivation of training statistics, classification of data using a maximum likelihood scheme, registration of an image to an image, numerous image data display capabilities, manipulations with polygons that define areas within the data, implementation on a point-by-point basis of algorithms coded in a programmable calculator type instruction set, and the regression, correlation, and other statistical analysis of the multivariate data sets. The ELAS system is also structured such that new applications modules can be easily integrated into the system.

The ELAS system is written in FORTRAN and ASSEMBLER for batch or interactive processing and has been implemented on the following computers: Perkin-Elmer 8/32 operating under OS32, Sperry Univac V70 operating under VORTEX II, PRIME 750 operating under PRIMOS, SEL 32/27 operating under MPX 32, and DEC VAX 11/780 operating under VMS 3.1. The ELAS system was developed in 1980 and last updated in 1983.

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ERL-10013  
ERL-10014  
ERL-10015  
ERL-10016  
ERL-10017

Perkin-Elmer 32 Version

LANGUAGE: FORTRAN IV (97%); ASSEMBLER (3%)

MACHINE REQUIREMENT: PERKIN-ELMER 32

PROGRAM SIZE: Approximately 50,000 Source Statements

DISTRIBUTION MEDIA: 9 Track 800BPI ASCII Card Image Format  
Magnetic Tape

PROGRAM NUMBER: ERL-10013

DOCUMENTATION PRICE: \$58.50

PROGRAM PRICE: \$3,775.00

Sperry Univac V70 Version

LANGUAGE: FORTRAN IV (50%); ASSEMBLER (50%)

MACHINE REQUIREMENTS: SPERRY UNIVAC V70

PROGRAM SIZE: Approximately 60,000 Source Statements

DISTRIBUTION MEDIA: 9 Track 1600 BPI ASCII Card Image Format  
Magnetic Tape

PROGRAM NUMBER: ERL-10014

DOCUMENTATION PRICE: \$70.00

PROGRAM PRICE: \$4,000.00

PRIME 750 Version

LANGUAGE: FORTRAN IV (99%); ASSEMBLER (1%)

MACHINE REQUIREMENTS: PRIME 700 Series

PROGRAM SIZE: 9 Track BPI PRIME MAGSAV Format Magnetic Tape

PROGRAM NUMBER: ERL-10015

DOCUMENTATION PRICE: \$58.50

PROGRAM PRICE: \$3,775.00

ERL-10013  
ERL-10014  
ERL-10015  
ERL-10016  
ERL-10017

SEL 32 Version

LANGUAGE:     FORTRAN 77 (99%); ASSEMBLER (1%)  
MACHINE REQUIREMENTS:     SEL 32 Series  
PROGRAM SIZE:     Approximately 50,000 Source Statements  
DISTRIBUTION MEDIA:     9 Track 800 BPI SEL SAVE Format Magnetic Tape  
PROGRAM NUMBER:     ERL-10016  
DOCUMENTATION PRICE:     \$58.50                     PROGRAM PRICE:     \$3,775.00

DEC VAX Version

LANGUAGE:     FORTRAN IV (99%); ASSEMBLER (1%)  
MACHINE REQUIREMENTS:     DEC VAX Series  
PROGRAM SIZE:     Approximately 50,000 Source Statements  
DISTRIBUTION MEDIA:     9 Track 800 BPI DEC VAX BACKUP Format  
                              Magnetic Tape  
PROGRAM NUMBER:     ERL-10017  
DOCUMENTATION PRICE:     \$58.50                     PROGRAM PRICE:     \$3,775.00

# COSMIC PROGRAM ABSTRACT

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GSC-12852

## THE NIMBUS-7 COASTAL ZONE COLOR SCANNER DERIVED PRODUCTS SOFTWARE (NASA Goddard Space Flight Center)

The Nimbus-7 Coastal Zone Color Scanner (CZCS) derived products software consists of a set of scientific algorithms for extracting information from CZCS gathered data. This software uses the CZCS generated Calibrated Radiance-Temperature (CRT) tape as input and outputs a computer compatible tape and a film product. The main functions of the CZCS derived products software are as follows: 1) flag all pixels of a scene as land/clouds or water, 2) determine the atmospheric effects due to Rayleigh scattering, ozone, aerosol, etc., 3) calculate subsurface radiances for channels 1 thru 3 after correcting the observed radiances for atmospheric attenuation, 4) use the subsurface radiances to compute pigment concentration and the diffuse attenuation coefficient, 5) produce a Calibrated Radiance Chlorophyll Sediment Temperature (CRCST) tape, and 6) produce an image display tape. The CRCST and image display tapes may be used for further analysis.

This software package also contains the CZCS Image Processing System (CIPS) and the Information and Production Control System (IPCS). These two systems are used by NASA Goddard to work with the raw analog data received from the Nimbus-7 satellite. It is not anticipated that these two systems will be of use outside the NASA Goddard facility. However, a study of them may be informative to a user of the derived products software.

The CZCS derived products software is written in FORTRAN, MORTAN (a structured FORTRAN), and OS Assembler. The system is tailored to the NASA Goddard IBM 3081 running OS MVS and probably will require modification to adapt it to any other site. This software was developed in 1982.

LANGUAGE: FORTRAN IV (96%); ASSEMBLER (4%)

MACHINE REQUIREMENTS: IBM 370 Series

PROGRAM SIZE: Approximately 8,000 Source Statements

DISTRIBUTION MEDIA: 9 Track 800 BPI EBCDIC Card Image Format  
Magnetic Tape

PROGRAM NUMBER: GSC-12852

DOCUMENTATION PRICE: \$82.00

PROGRAM PRICE: \$750.00

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# COSMIC PROGRAM ABSTRACT

GSC-12881

**TAE - TRANSPORTABLE APPLICATIONS EXECUTIVE**  
(NASA Goddard Space Flight Center)

The Transportable Applications Executive (TAE) is a collection of "executive" programs which interact with a user to manage the execution of applications programs. A main purpose of TAE is to standardize the user interface to applications programs. All applications programs running under TAE have a consistent human interface. Also with TAE, the user is shielded from the host operating system. The user of an applications program running under TAE does not need to know the command language of the host computer, TAE manages the entire interactive session. Another primary purpose of TAE is to provide the applications program user with a user-friendly environment. TAE is designed to be utilized effectively and efficiently by both the first-time user and the experienced user. TAE can provide extensive assistance to the user at any stage of an interactive session.

TAE permits the user to operate in three different modes. In the menu mode, the user proceeds through a session by selection from a list of options. Each entry in a menu refers to an application function or to another menu. In the command mode, the user can communicate with TAE via a simple command language. In the tutor mode, the user can establish and review sets of parameters to be supplied to an applications program. An extensive "HELP" facility is available in each mode. Also, the user is free to switch between modes as desired. Because the implementation of an application function is independent of the TAE mode, every application is available from each of the modes.

Special features are provided to assist the applications programmer in interfacing with TAE. A major aspect of the TAE/applications program interface is the "proc" entity which can be executed to perform a function. A proc is either a process or a procedure. A process is a program for which executable code exists. A procedure is a "command procedure" written in the TAE command language. Extensive proc management capabilities are available to the applications programmer. A library of TAE utility subroutines are available to standardize access to primitive host functions and to enhance the portability of the calling program. The programmer is also assisted in the development of help text files and menus.

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GSC-12881

This prototype version of TAE is written in RATFOR, VAX FORTRAN, and MACRO ASSEMBLER and has been implemented on a DEC VAX 11/780 operating under VMS. A specialized RATFOR to FORTRAN translator is included with the TAE system.

The TAE program product is available by lease for a period of 10 years to domestic U.S. lessees. The leased program product includes the TAE source, object, and executable codes, sample applications, and one set of supporting documentation. Copies of the supporting documentation may be purchased separately at the price indicated below.

LANGUAGE: FORTRAN IV (99%); ASSEMBLER (1%)

MACHINE REQUIREMENTS: DEC VAX 11/780

PROGRAM SIZE: Approximately 12,000 Source Statements

DISTRIBUTION MEDIA: 9 Track 1600 BPI DEC VAX BACKUP Format  
Magnetic Tape

PROGRAM NUMBER; GSC-12881

DOCUMENTATION PRICE: \$50.00

LEASE FEE: \$2,000.00

8/1/83

# COSMIC PROGRAM ABSTRACT

LAR-13183

PAFAC - PLASTIC AND FAILURE ANALYSIS OF COMPOSITES  
(NASA Langley Research Center)

The increasing number of applications of fiber-reinforced composites in industry demands a detailed understanding of their material properties and behavior. A three-dimensional finite-element computer program called PAFAC (Plastic and Failure Analysis of Composites) has been developed for the elastic-plastic analysis of fiber-reinforced composite materials and structures. The evaluation of stresses and deformations at edges, cut-outs, and joints is essential in understanding the strength and failure of composites. In addition, elastic-plastic analysis is crucial for metal-matrix composites since the onset of plastic yielding starts very early in the loading process as compared to the composite's ultimate strength. Such comprehensive analysis can only be achieved by a finite-element program like PAFAC. PAFAC is particularly suited for the analysis of laminated metal-matrix composites. It can model the elastic-plastic behavior of the matrix phase while the fibers remain elastic. Since the PAFAC program uses a three-dimensional element, the program can also model the individual layers of the laminate to account for thickness effects.

In PAFAC, the composite is modeled as a continuum reinforced by cylindrical fibers of vanishingly small diameter which occupy a finite volume fraction of the composite. In this way, the essential axial constraint of the phases is retained. Furthermore, the local stress and strain fields are uniform. The PAFAC finite-element solution is obtained using the displacement method. Solution of the nonlinear equilibrium equations is obtained with a Newton-Raphson iteration technique. The elastic-plastic behavior of composites consisting of aligned, continuous elastic filaments and an elastic-plastic matrix is described in terms of the constituent properties, their volume fractions, and mutual constraints between phases indicated by the geometry of the microstructure. The program uses an iterative procedure to determine the overall response of the laminate, then from the overall response determines the stress state in each phase of the composite material. Failure of the fibers or matrix within an element can also be modeled by PAFAC.

PAFAC is written in FORTRAN IV for batch execution and has been implemented on a CDC CYBER 170 series computer with a segmented memory requirement of approximately 66K (octal) of 60 bit words. PAFAC was developed in 1982.

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LAR-13183

LANGUAGE: FORTRAN IV

MACHINE REQUIREMENTS: CDC CYBER 170 Series

PROGRAM SIZE: Approximately 7,070 Source Statements

DISTRIBUTION MEDIA: 9 Track 800 BPI CDC NOS Internal Format  
Magnetic Tape

PROGRAM NUMBER: LAR-13183

DOCUMENTATION PRICE: \$22.50

PROGRAM PRICE: \$1,125.00

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# COSMIC PROGRAM ABSTRACT

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LEW-14000

ANDUCT - VELOCITY GRADIENT METHOD FOR CALCULATING VELOCITIES IN  
AN AXISYMMETRIC ANNULAR DUCT  
(NASA Lewis Research Center)

Turbomachinery components are often connected by ducts, which are usually annular. The configurations and aerodynamic characteristics of these ducts are crucial to the optimum performance of the turbomachinery blade rows. The ANDUCT computer program was developed to calculate the velocity distribution along an arbitrary line between the inner and outer walls of an annular duct with axisymmetric swirling flow. Although other programs are available for duct analysis, the use of the velocity gradient method makes the ANDUCT program fast and convenient while requiring only modest computer resources.

A fast and easy method of analyzing the flow through a duct with axisymmetric flow is the velocity gradient method, also known as the stream filament or streamline curvature method. This method has been used extensively for blade passages but has not been widely used for ducts, except for the radial equilibrium equation. In ANDUCT, a velocity gradient equation derived from the momentum equation is used to determine the velocity variation along an arbitrary straight line between the inner and outer wall of an annular duct. The velocity gradient equation is used with an assumed variation of meridional streamline curvature. Upstream flow conditions may vary between the inner and outer walls, and an assumed total pressure distribution may be specified. ANDUCT works best for well-guided passages and where the curvature of the walls is small as compared to the width of the passage.

The ANDUCT program is written in FORTRAN IV for batch execution and has been implemented on an IBM 370 series computer with a central memory requirement of approximately 60K of 8 bit bytes. The ANDUCT program was developed in 1982.

LANGUAGE: FORTRAN IV

MACHINE REQUIREMENTS: IBM 370 Series

PROGRAM SIZE: Approximately 540 Source Statements

DISTRIBUTION MEDIA: 9 Track 800 BPI EBCDIC Card Image Format  
Magnetic Tape

PROGRAM NUMBER: LEW-14000

DOCUMENTATION PRICE: \$10.00

PROGRAM PRICE: \$250.00

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# COSMIC PROGRAM ABSTRACT

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MSC-20278

IPMS II - INTEGRATED PROCUREMENT MANAGEMENT SYSTEM, VERSION II  
(Computer Sciences Corporation)

The Integrated Procurement Management System Version II (IPMS) is an online/batch system for collecting, developing, managing, and disseminating procurement related data at NASA's Johnson Space Center. IPMS II takes into account the needs of procurement managers, the NASA field center management, and NASA Headquarters. IPMS II provides an extensive data base management and inquiry capability, and a reporting capability to the procurement division. Access to the IPMS II capabilities is via online terminals and batch processing. Although the IPMS II system is somewhat specific to the needs of the NASA Johnson Space Center, portions of the system may be adaptable to other procurement situations.

IPMS II is an ASCII COBOL System using Multi-Indexed Sequential Access Method (MSAM) for storage and retrieval of information from mass-storage files. IPMS II consists of two major subsystems: online and batch. The online subsystem has three major functions: pre-processing, template processing, and recovery. Pre-processing ensures that the data base is ready for the online user. Template processing provides online user access to the data base files. Recovery is used to restore data base files when necessary. The batch subsystem provides for batch reporting and year end processing.

IPMS II is written in COBOL and ASSEMBLER and has been implemented on a UNIVAC 1108 computer operating under EXEC8 with a minimum memory requirement of 65K of 36 bit words. IPMS II uses Megadata CRT terminals for all online functions. IPMS II was developed in 1980.

LANGUAGE: COBOL (99%); ASSEMBLER (1%)

MACHINE REQUIREMENTS: UNIVAC 1100 Series

PROGRAM SIZE: Approximately 69,000 Source Statements

DISTRIBUTION MEDIA: 9 Track 1600 BPI UNIVAC FURPUR Format Magnetic Tape

PROGRAM NUMBER: MSC-20278

DOCUMENTATION PRICE: \$77.00

PROGRAM PRICE: \$2,800.00

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# COSMIC PROGRAM ABSTRACT

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MSC-20641

DATA I/O PROM PROGRAMMER SOFTWARE FOR THE MOTOROLA EXORCISOR  
(Rockwell International Corporation)

A driver program for the DATA I/O PROM Programmer has been developed on the Motorola M6800 EXORCISOR Development Workstation. The program allows for the programming, reading, and verification of various PROMs. Manual entry of data to the DATA I/O PROM Programmer is time consuming and error prone. This driver program combines the file management capability of the EXORCISOR with the flexibility of the DATA I/O system. It provides the user with the means of reading, programming, and verifying PROMs, storing data on disk, modifying files, and printing the data for documentation purposes.

This program is written in ASSEMBLER for the Motorola EXORCISOR with EXORDISK and 16K of RAM operating under MDOS. The program acts as a driver for the DATA I/O System 19 PROM Programmer with the remote option. This program was developed in 1981.

LANGUAGE: ASSEMBLER

MACHINE REQUIREMENTS: Motorola EXERCISOR

PROGRAM SIZE: Approximately 1,000 Source Statements

DISTRIBUTION MEDIA: 8 Inch MDOS Formatted Flexible Diskette

PROGRAM NUMBER: MSC-20641

DOCUMENTATION PRICE: \$12.50

PROGRAM PRICE: \$100.00

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# COSMIC PROGRAM ABSTRACT

MSC-20642

AERODYNAMIC SHOCK-LAYER SHAPE  
(Rockwell International Corporation)

This program was written to calculate the aerodynamic shock-layer shape and can be used to determine the heating and pressure loads exerted on a blunt body by the impingement of an equilibrium gas medium at supersonic velocities and at angles-of-attack greater than thirty degrees. This program has been used to calculate the shock-layer shape on the Space Shuttle Orbiter centerline in order to determine the aerodynamic heating and pressure loads during reentry. Varying elliptical cross sections, which closely coincide with the windward edge of the local body, are used to calculate the shock-layer thickness as a function of both the angle-of-attack and the free stream velocity variables. The user can accurately calculate the shape and thickness of the shock layer and thereby determine the boundary layer edge properties resulting from the impingement.

This program is written in HP BASIC for the Hewlett-Packard 9830 computer. This program was developed in 1982.

LANGUAGE: BASIC

MACHINE REQUIREMENTS: HP 9830

PROGRAM SIZE: Approximately 170 Source Statements

DISTRIBUTION MEDIA: Listing Available Only

PROGRAM NUMBER: MSC-20642

PRICE: \$30.00

NOTE: The price includes program documentation and a program listing.  
The documentation is not sold separately from the program listing.

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# COSMIC PROGRAM ABSTRACT

MSC-20644

PLATE.FORT - A DATA GENERATING PROGRAM FOR ASKA MODELING  
(Rockwell International Corporation)

The carrier plate assemblies of the NASA Space Shuttle thermal protection system are provided for easy access to the protected vital parts of the shuttle. Each assembly is mounted on the substructure with fasteners through holes in the protective tiles. Because of the complexity of the carrier plate assemblies and variations in many different parameters, the Automatic System of Kinematic Analysis (ASKA) finite element program is used to evaluate these assemblies. The PLATE.FORT computer program was developed as a data generator for ASKA modeling. PLATE.FORT greatly reduces the amount of time and data required for building an ASKA model of these assemblies. PLATE.FORT may be adaptable to other ASKA modeling situations.

This program is written in FORTRAN IV for batch execution and has been implemented on an IBM 370 series computer with a central memory requirement of approximately 420K of 8 bit bytes. The PLATE.FORT program was developed in 1982.

LANGUAGE: FORTRAN IV

MACHINE REQUIREMENTS: IBM 370 Series

PROGRAM SIZE: Approximately 1,275 Source Statements

DISTRIBUTION MEDIA: 9 Track 800 BPI EBCDIC Card Image Format  
Magnetic Tape

PROGRAM NUMBER: MSC-20644

DOCUMENTATION PRICE: \$22.50

PROGRAM PRICE: \$370.00

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8/1/83



# **COSMIC PROGRAM ABSTRACT**

MSC-20645

## **STANDARD FASTENER HARDWARE LIBRARY FOR A GRAPHICS COMPUTER (Rockwell International Corporation)**

Industry is making extensive use of graphics computers in the production of engineering drawings. When available software packages do not provide for graphic representation of individual details of fastener hardware, the operator must construct each nut and bolt used on the drawing individually. This is a time consuming operation, especially when large assembly or installation drawings are involved. A computer program has been developed, for use in conjunction with a graphics system, which creates a library of standard fastener hardware detail programs. The programs are categorized by basic fastener geometric shape with tabulated sizes. Fastener details may be recalled by configuration and size for insertion into a drawing on the screen during normal graphics operations. This program has been used in the production of engineering drawings for the Space Shuttle Orbiter.

This program is written in PEP (Parametric Element Processor) for the Computer Vision Model 109S computer with the CADDS 3 graphics software. This program was developed in 1982.

LANGUAGE: PEP

MACHINE REQUIREMENTS: Computer Vision Model 1095

PROGRAM SIZE: Approximately 1,300 Source Statements

DISTRIBUTION MEDIA: 9 Track 1600 BPI CV SAVFIL Format  
Magnetic Tape

PROGRAM NUMBER: MSC-20645

DOCUMENTATION PRICE: \$8.00

PROGRAM PRICE: \$370.00

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# COSMIC PROGRAM ABSTRACT

NPO-16274

ARCH - A FILE ARCHIVAL SYSTEM FOR THE DEC VAX  
(Caltech/JPL)

The development of different software packages by a variety of programmers can lead to a proliferation of different versions of the same programs and their associated files. This situation can tie up disk space and lead to confusion. ARCH, a file archival system for the DEC VAX, was designed to provide for the easy off-line storage and retrieval of arbitrary files on a DEC VAX system. ARCH can handle any of the three types of Files-11 file formats (indexed, sequential, and relative), with a given type of file being allowed to have any arbitrary contents. The files are initially stored on disk with eventual movement to tape storage. A complete history is maintained through a directory file which contains a list of the entire contents of each backup tape. Each tape also contains enough information to affect a system recovery.

Upon archiving by ARCH, a file is copied into a special disk directory and an extensive entry for the file is made in the internal catalogs. While being copied, the file is changed to internal format and two classes of user supplied comments may be added, (short) summary information and (long) detailed description. Groups of files from this special disk directory can be moved onto tape. The system can always be restored to the state it had at the time of the latest backup tape generation, should a catastrophic disk failure occur. Several features aid the user in searching the archived files to eliminate the unnecessary de-archiving of files while searching for a particular file. When a file is retrieved (de-archived) the new user file duplicates the original file with the option of adding the user supplied archive comments. An internal help facility can provide assistance in all phases of the ARCH system.

Privileged management functions provided by ARCH include commands that allow initialization or restoration of the special disk directory, commands that allow re-calculation (re-alphabetization) of the index of files resident on disk, and a command which will locate those files in the special disk directory which are not known to the system. There are also subsidiary programs that allow listing the contents of the catalog files, checking the integrity of the system, and calculating how much space is taken up by files which have not yet been moved to tape.

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NPO-16274

The ARCH system is written in FORTRAN and VAX-11 MACRO-32, Assembler and has been implemented on a DEC VAX-11/780 operating under VMS 3.2. ARCH should be compatible with any machine of the DEC VAX family running VMS 3.0 or higher. The ARCH system was developed in 1983.

LANGUAGE:     FORTRAN IV (88%); ASSEMBLER (12%)

MACHINE REQUIREMENTS:   DEC VAX 11/780

PROGRAM SIZE:     Approximately 8,000 Source Statements

DISTRIBUTION MEDIA:    9 Track 1600 BPI DEC VAX Files-11 Format  
                          Magnetic Tape

PROGRAM NUMBER:     NPO-16274

DOCUMENTATION PRICE:     \$12.50

PROGRAM PRICE:     \$975.00

8/1/83

#### 4. MARKETING

The marketing activities performed by COSMIC involve: solicitation of gratis advertisement of computer programs available from COSMIC in the technical press and trade journals; attendance at trade shows and professional society meetings to promote the services and software available from COSMIC; utilization of various media for the general promotion of COSMIC; utilization of benefits analysis reports to highlight COSMIC's technology transfer function; and preparation of abstract collections and program summaries.

A continuing marketing activity emphasized by COSMIC is the solicitation of gratis announcements of selected COSMIC programs in trade and technical publications. In July announcements about COSMIC products were published in:

Computer Decisions (June 83)	VAX Security, MSC-20423
Computerworld	CRISP80, NPO-16234
Orlando Sentinel Star	General Information

Three news releases were prepared this month. A news release for SINDA (GSC-12671) and TRASYS (GSC-12783) was sent to:

Journal of Heat Transfer  
Heat Transfer Engineering  
DEC Professional  
DECUSCOPE  
Hardcopy

A robotics and control news release containing information on DISCOS (GSC-12810), NBOD-2 (GSC-12846), SAMSAN (GSC-12827), ORACLS (LAR-12313), MODEL (GSC-12723), and MOVER (MFS-23806) was mailed to the following publications:

Mechanical Engineering  
CIME - Computers in Mechanical Engineering  
IEEE Automatic Control  
Journal of Dynamic Systems, Measurement, and Control  
Southeastern Conductor  
Control Engineering

And finally, an announcement about the Interactive Digital Signal Processor (GSC-12862) was sent to:

Computerworld  
Datamation  
Electronic Design  
IEEE Aerospace and Electronic Systems  
EE Times  
AEC Automation Newsletter

A news release about COSMIC and 1,000 COSMIC brochures were sent to NERAC this month. Dr. Wilde requested this material to help promote COSMIC to NERAC's clients.

Two computer hardware companies contacted COSMIC for information about software available on their hardware. Digital Equipment Corporation is publishing a PDP-11 Software Source Book this Fall. COSMIC supplied information to them on the following programs: MARS (GSC-12708), CAT (GSC-12710), SEL/DBAM (GSC-12669), VICAR (NPO-14892), and DOCLIB (GSC-12803). Also, Control Data Corporation requested information for their Applications Directory, which will be published in January, 1984. Information on the following programs was sent: SINDA (MSC-18597), UPLITE (DOD-00072), Hidden Line Code (ARC-11446), PPARS (LAR-12919), FLAGRO IV (MSC-18718), PASCO (LAR-13004), SPAR (LAR-12542), STAGSC-1 (HQN-10960), NASTRAN (HQN-10953), PLANS (LAR-12816), ELPLOT (LAR-12793), and ORACLS (LAR-12313).

## 5. CUSTOMER SERVICE

Customer Service provided by COSMIC, in addition to the distribution of program code and documentation, includes responding to requests for information. These requests may be in the form of telephone calls, letters, TECH BRIEF cards, mini-brochure cards, or trade show return cards. Generally the requested information concerns the services provided by COSMIC, or information on specific programs or groups of programs which may be available from COSMIC. During July, a total of 678 information requests were processed. This was divided into 655 domestic requests and 23 international requests.

One other area of Customer Service is the response to requests for information relevant to problems associated with a particular program product installation. These requests are usually handled jointly with the Technical Service Staff. After the customer problems have been resolved, a Problem Report Sheet is processed and added to the program package file for future reference. Seven problem reports were processed this month.

During the month of July, a total of 145 customers representing 131 organizations received materials (programs, documentation, or catalogs) from COSMIC. Customers represent individuals, whereas, organizations represent corporations or institutions. These customers are located in 32 different states or territories. Both NASA and non-NASA disseminations are reflected in these statistics.

The latest updates to ARC-11446 Hidden Line Code were mailed to all 243 previous customers.

## 6. BENEFITS IDENTIFICATION

COSMIC follows an active campaign of interviewing previous customers in order to ascertain the utility of distributed programs and identify specific benefits accruing to users of these programs. Additionally, contact with customers is used to evaluate the services provided by COSMIC. When notable benefits are identified, they are documented in reports written by COSMIC staff which are then approved for public release by the customers. No benefits reports were released for publication this month.

## 7. MAINTENANCE AND SUPPORT

Sperry continued the testing of the ASCII UNIVAC version of NASTRAN. This is scheduled to be released during August. All other versions of NASTRAN have been completed and shipped to current lessees. Sperry completed the editing of the documentation of the new enhancements incorporated into the April 1983 version of NASTRAN. Sperry is nearing completion of the documentation of all SPR's incorporated in the 1983 release. After receipt of this documentation, the SPR LOG will be updated and mailed to all current lessees.

The Twelfth NASTRAN® Users' Colloquium is scheduled for May 7-11, 1984, in Orlando, Florida. The schedule for paper preparation is as follows:

October 3, 1983	Abstracts Due
October 17, 1983	Authors of Selected Papers are Notified and Provided with Manuscript Preparation Instructions
February 15, 1984	Final Manuscripts Due
May 10-11, 1984	Colloquium in Orlando, Florida

During the month, assistance was given to several lessees on problems encountered with NASTRAN.



TABLE 4 TOTAL DISSEMINATIONS

ITEM	Current Month		Year to Date	
	VOLUME	VALUE	VOLUME	VALUE
<b>A. ITEMS INVOICED</b>				
1. Programs	33	\$23,795.00	268	\$272,526.25
2. Documentation	127	5,225.50	970	40,519.00
3. Leases (Initial)	5	18,760.00	36	141,830.00
4. Leases (Renewals)	1	3,000.00	34	126,480.00
5. Leases (Misc.)	-	-	10	2,951.14
6. Catalogs	61	1,750.00	866	20,875.00
7. Miscellaneous	13	502.98	99	4,038.97
<b>TOTAL INVOICED</b>		<b>\$53,033.48</b>		<b>\$609,220.36</b>
<b>B. NASA (No Charge)</b>				
1. Programs	11	\$10,315.00	42	\$ 45,545.00
2. Documentation	18	522.00	221	11,586.00
3. Leases (Initial)	2	9,700.00	9	36,580.00
4. Leases (Renewals)	-	-	16	56,940.00
5. Leases (Misc.)	-	-	-	-
6. Catalogs	61	650.00	114	1,260.00
7. Miscellaneous	-	-	1	100.00
<b>TOTAL NASA</b>		<b>\$21,187.00</b>		<b>\$152,011.00</b>
<b>C. OTHER (No Charge)</b>				
1. Catalogs	2	\$ 20.00	20	\$ 370.00
2. Replacements	-	-	4	1,608.00
3. Miscellaneous	-	-	-	-
<b>TOTAL OTHER</b>		<b>\$ 20.00</b>		<b>\$ 1,978.00</b>
<b>GRAND TOTAL DISSEMINATION</b>		<b>\$74,240.48</b>		<b>\$763,209.36</b>

TABLE 5 NASTRAN DISSEMINATIONS

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Item	Current Month		Year to Date	
	VOLUME	VALUE	VOLUME	VALUE
<b>A. ITEMS INVOICED</b>				
1. Leases Initial	2	\$ 8,960.00	16	\$ 67,480.00
2. Leases Renewals	-	-	29	114,870.00
3. Leases Misc.	-	-	5	1,843.03
4. Documentation	21	995.00	145	7,510.00
5. Miscellaneous	-	-	3	136.02
TOTAL NASTRAN INVOICED		\$ 9,955.00		\$191,839.05
<b>B. NASA (No charge)</b>				
1. Leases Initial	1	\$ 5,600.00	4	\$ 20,480.00
2. Leases Renewals	-	-	14	51,240.00
3. Leases Misc.	-	-	-	-
4. Documentation	-	-	131	8,255.00
5. Miscellaneous	-	-	-	-
TOTAL NASA NASTRAN		\$ 5,600.00		\$ 79,975.00
GRAND TOTAL NASTRAN		\$15,555.00		\$271,814.05

TABLE 6 DISSEMINATION OF DOD SUBMITTALS

Item	Current		Year to Date	
	VOLUME	VALUE	VOLUME	VALUE
1. Programs	5	\$2,010.00	19	\$ 10,890.00
2. Documentation	7	137.50	40	911.50
TOTAL DISSEM. DOD SUBMITTALS		\$2,147.50		\$ 11,801.50

TABLE 7 FOREIGN DISSEMINATIONS

Item	Current		Year to Date	
	VOLUME	VALUE	VOLUME	VALUE
1. Programs	3	\$6,930.00	63	\$125,830.00
2. Documentation	12	1,531.00	130	10,545.00
3. Leases Initial	-	-	2	13,800.00
4. Leases Renewal	-	-	-	-
5. Leases Misc.	-	-	1	35.70
6. Catalogs	11	650.00	112	5,575.00
7. Miscellaneous	6	364.10	56	2,310.81
TOTAL FOREIGN DISSEM.		\$9,475.10		\$158,096.51

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9. BUDGET SUMMARY  
CONTRACT NASW-3247  
JULY 1983

	<u>ESTIMATED EXPENDITURES</u>		<u>ACTUAL EXPENDITURES</u>	
	<u>Current Mo.</u>	<u>Cumulative</u>	<u>Current Mo.</u>	<u>Cumulative</u>
PERSONNEL	20,673.00	144,711.00	21,952.50	148,932.93
OVERHEAD	19,584.00	137,088.00	34,933.23	136,439.62
STAFF BENEFITS	4,942.00	34,594.00	5,300.22	36,304.50
TRAVEL	1,719.00	12,033.00	812.10	11,742.43
EQUIPMENT PURCHASE	400.00	2,800.00	-0-	14,466.86
EQUIPMENT RENTAL				
Computer Usage	8,000.00	56,000.00	3,170.69	32,554.73
Misc. Equipment	1,853.00	12,971.00	1,420.79	5,958.14
MATERIALS & SUPPLIES	6,421.00	44,947.00	4,874.58	47,490.17
COMMUNICATIONS	1,206.00	8,442.00	1,271.63	9,817.84
OTHER				
Duplicating Expenses	-0-	-0-	-0-	-0-
Promotional Expenses	688.00	4,816.00	75.00	13,173.26
Microfiche Expenses	599.00	4,193.00	-0-	1,133.05
TOTALS	66,085.00	462,595.00	73,810.74	458,013.53
MAINTENANCE & SUPPORT EXPENSE	27,448.00	192,136.00	34,784.35	207,297.08
GRAND TOTALS	93,533.00	654,731.00	108,595.09	665,310.61

	<u>ESTIMATED</u>		<u>ACTUAL</u>	
	<u>Current Mo.</u>	<u>Cumulative</u>	<u>Current Mo.</u>	<u>Cumulative</u>
INCOME	65,145.00	456,015.00	42,547.57	619,541.81